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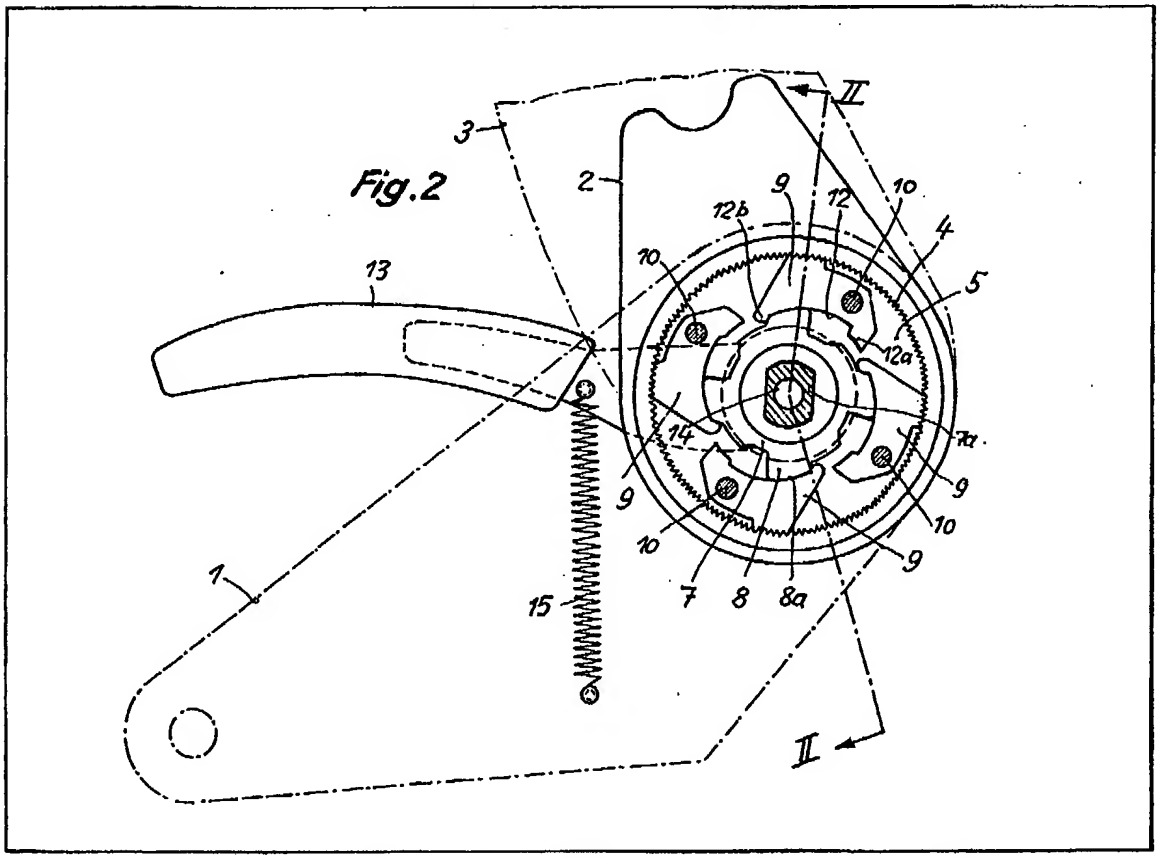
(54) Hinge assemblies

(57) A hinge assembly for seats with an adjustable back rest includes fixed and pivotal hinge parts (1, 2). Four toothed detents (9) are pivotally mounted to one hinge part (1). In the locked position of the assembly a toothed segment of each detent (9) engages an internally toothed ring (4) of the other part (2). A rotatably mounted control member (7) is mounted inside the ring (4). Rotation of this control member (7) in one sense disengages the toothed segments of the detents (9) from the internally toothed ring (4) to allow the hinge parts (1, 2) to be moved relative to one another, and rotation in the opposite sense engages the toothed segments of the detents (9) with the internally toothed ring (4) to lock the hinge assembly into the adjusted position.



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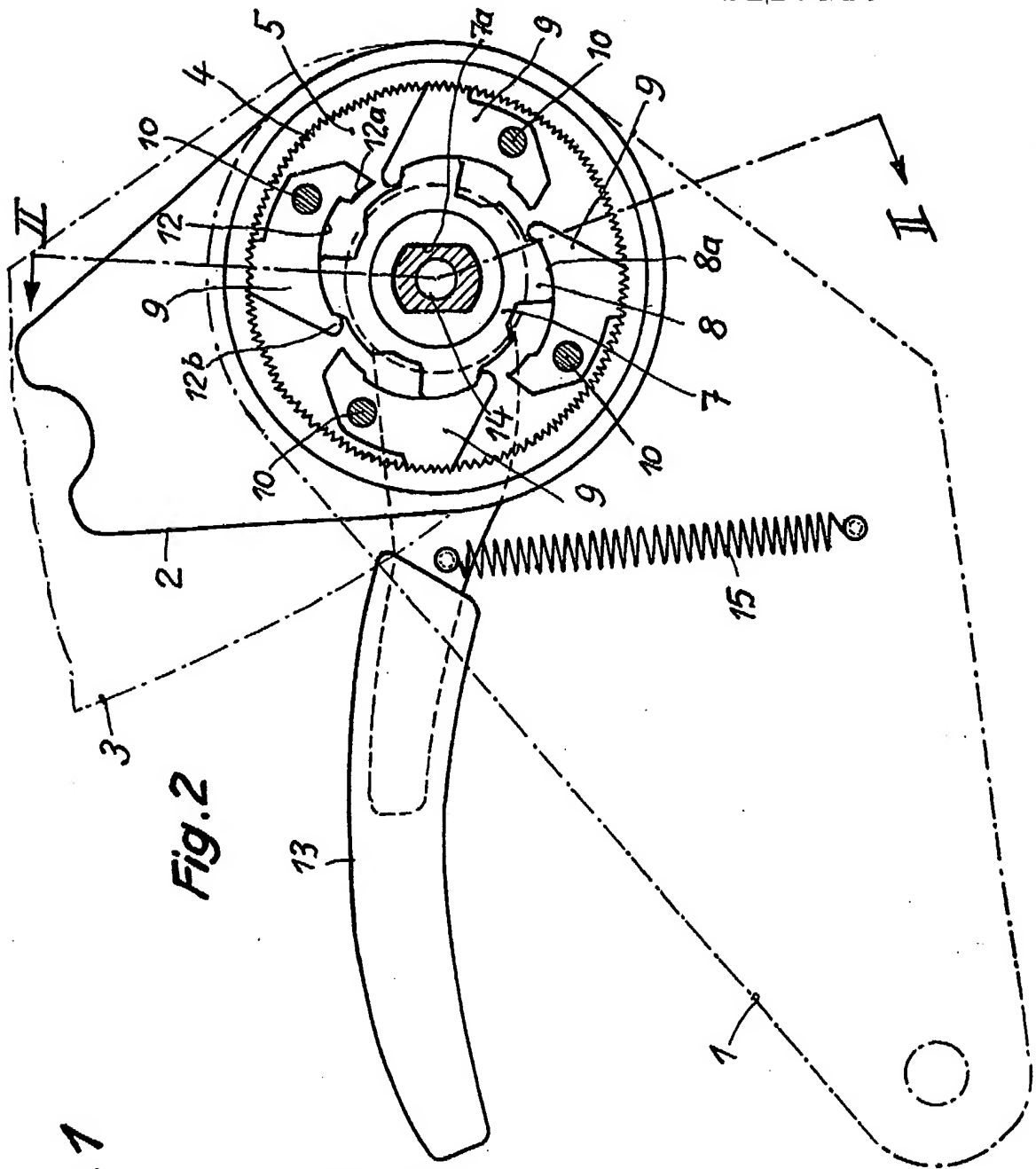


Fig.2

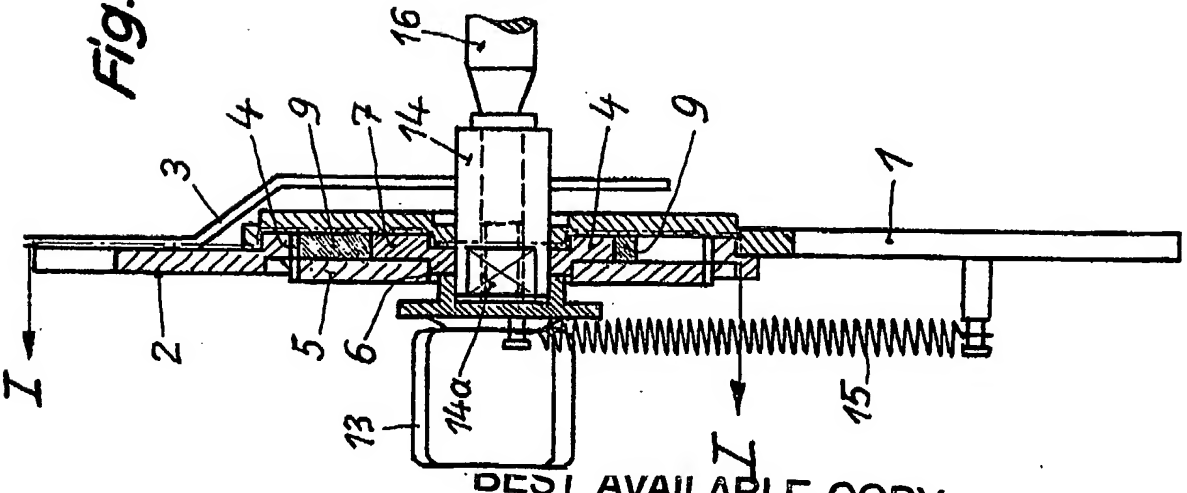


Fig.1

Fig. 3

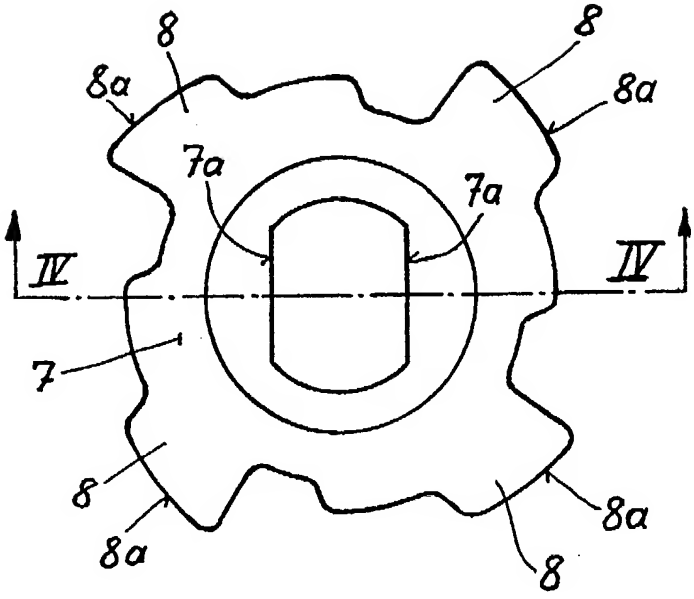


Fig. 4

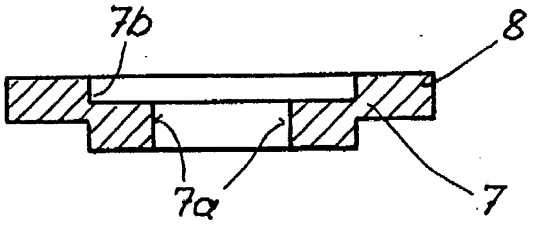
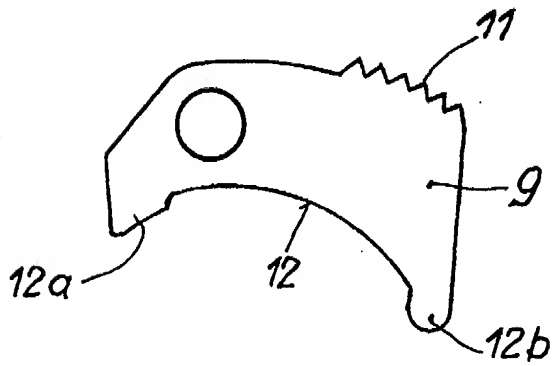


Fig. 5



SPECIFICATION

Hinge assemblies

The present invention relates to hinge assemblies, particularly for seats with adjustable back rests, particularly motor vehicle seats. Such seats include a fixed hinge part associated with the seat part and a pivotal hinge part associated with the back rest. The two hinge parts are connected to each other via a pivot axis and have a locking device for determining the position of the two parts relative to each other. The locking device is capable of being moved via a handle into a released position to allow adjustment of the position of the back rest relative to the seat part. After releasing of the handle, which is subject to the action of a restoring element, the locking device moves back into the locked position.

The present invention provides a hinge assembly comprising a fixed hinge part, a hinge part pivotally movable relative to the fixed hinge part about a pivot axis, an internally toothed ring defined in one of said hinge parts, at least one toothed detent pivotally mounted within said internally toothed ring for movement between a position in which it engages said internally toothed ring and a position in which it does not engage said internally toothed ring, and a control member rotatably mounted within said internally toothed ring and operable to disengage the toothed detent upon rotation of the control member in one sense and to engage the toothed detent upon rotation of the control member in the other sense.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings in which:

Figure 1 shows a section of a hinge assembly on the line II-II in Figure 2;

Figure 2 shows a section of a hinge assembly on the line I-I in Figure 1;

Figure 3 shows on an enlarged scale a view of a control member of the hinge assembly;

Figure 4 shows a section on the line IV-IV in Figure 3; and

Figure 5 is a view of a toothed detent of the locking device of the hinge assembly.

Reference numeral 1 denotes a fixed hinge part associated with the seat, while reference numeral 2 denotes a hinge part which is pivotable relative to the hinge part 1 and to which the associated side member 3 of the back rest is suitably connected.

Disposed on the hinge part 2 is an internally toothed ring 4 which forms one physical unit with the hinge part 2. The free space inside this internally toothed ring 4 is provided with a bridge 5 which is constructed as a pushed-out member integral with the internally toothed ring 4. The bridge 5 has a bearing 6 for a control member 7, the details of which can be seen in Figure 3 and 4.

As Figures 3 and 4 show, the control member 7 has four control cams, with convex control faces 8*a*. Naturally, it is possible to provide also more or fewer than four control cams 8.

Corresponding to the number of control cams 8 on the control member 7, so four toothed detents 9 are articulated on the hinge part 1. Articulation is effected via four journals 10 about which the toothed detents 9 are pivotally mounted. These journals 10 are rigidly connected to the hinge part 1. Figure 5 shows details of the toothed detent 9. The toothed detent 9 has a toothed segment 11 and a control surface 12 which is so adapted to the control surface 8*a* of the control cam 8 that during the rotary movement of the control member 7, the control surface 8*a* moves along the control surface 12 and, as a function of the direction of rotation of the control member 7, so engages or disengages the toothed segment 11 of the toothed detent 9 with or from the internally toothed ring 4.

The exact form of the two co-operating control surfaces 8*a* and 12 can be ascertained empirically or by other methods as will be appreciated by a man skilled in the art. It is clear that these two control surfaces 8*a*, 12 should be so formed that in the locked position, a reasonable pressure is assured upon engagement of the toothed segment 11 with the internally toothed ring 4. The control surface 12 is defined at both ends by cam-like projections 12*a*, 12*b*. The pivoting movement of the control member 7 into the locked position is effected via a handle 13 which, as illustrated, takes the form of a lever. The lever is connected via a journal which is circular in cross-section and which carries at the end towards the lever a flattened portion 14*a*, the respective flattened portions 14*a* being disposed opposite corresponding bearing surfaces 7*a* in the control member 7 (Figure 3). In this way, it is ensured that upon pivoting of the lever, the control member 7 is also entrained, i.e. co-rotated.

The handle 13 is subject to the action of a restoring element, namely a return spring 15 (Figure 2), of which one end is mounted on the handle 13 while the other end is mounted on the hinge part 1.

The control member 7 has a recess 7*b* which serves as a bearing for the fixed hinge part 1.

As Figure 1 shows, there is located in the journal 14, an insertable shaft 16, which transmits the rotary movement to the oppositely disposed hinge assembly.

The back rest, not shown in the drawing, is subject to the action of springs which, when the locking device is released, seek to pivot the back rest in a forwards direction.

The assembly operates as follows:

In the locked position, the individual parts of the assembly assume the position shown in Figure 2 of the drawings. If the back rest is to be pivoted, then the handle 13 is pivoted against the force of the restoring spring 15 in Figure 2 of the drawings, in other words in a clockwise direction. This pivoting movement is transmitted to the control member 7, which rotates in the same direction, in other words likewise in a clockwise direction. In consequence, the control surface 8*a* of each control cam 8 moves along the control surface 12 of the associated toothed detent 9 sufficiently for the corresponding cam 8 to strike the cam-like projection 12*a*. Further rotary movement produces a pivoting of the toothed detents 9 around their journals 10 in an anticlockwise direction and thus into the released position of the locking device. The back rest may then be

adjusted to a desired position relative to the seat part.

Upon reaching the desired position of the back rest, the handle 13 is released, then under the action of the restoring spring 15, the handle 13 pivots in an anticlockwise direction. This causes a corresponding pivoting movement of the control member 7 so that the control surfaces 8*a* of the cams 8 move along the associated control surfaces 12 of the toothed detents 9 and then strike the cam-like projection 12*b*. The result is that the toothed detents 9 pivot about their journals 10 in a clockwise direction and the teeth of the toothed segment 11 are caused to engage the internally toothed ring 4 thus locking the hinge assembly into the desired position.

It will be appreciated that the above-described hinge assembly is of simple design and is easy to operate. Moreover, the locking device is resistant to unintended release even under increased loadings on the back rest as, for example, in the case of a collision.

CLAIMS

1. A hinge assembly comprising a fixed hinge part, a hinge part pivotally movable relative to the fixed hinge part about a pivot axis, an internally toothed ring defined in one of said hinge parts, at least one toothed detent pivotally mounted within said internally toothed ring for movement between a position in which it engages said internally toothed ring and a position in which it does not engage said internally toothed ring, and a control member rotatably mounted within said internally toothed ring and operable to disengage the toothed detent upon rotation of the control member in one sense and to engage the toothed detent upon rotation of the control member in the other sense.

2. A hinge assembly according to claim 1, further including a journal rigidly connected to the other hinge part for pivotally mounting said toothed detent.

3. A hinge assembly according to claim 1 or 2, further including a lever connected to the control member for rotating said control member.

4. A hinge assembly according to any preceding claim, further including a control cam carried by said control member, said toothed detent including a control face which is co-operable with said control cam for moving said toothed detent between said engaged and disengaged positions.

5. A hinge assembly according to any preceding claim, in which said internally toothed ring is formed in one piece with said second hinge part, and further including a bridge portion formed integrally with said second hinge part and displaced relative to the interior space defined by said internally toothed ring, said bridge portion defining a bearing for said control member.

6. A hinge assembly according to any preceding claim, in which said control member defines a recess which serves as a bearing for said first hinge part.

7. A hinge assembly for a seat having a seat part and a back rest, pivotally movable relative to said seat part about a pivot axis, comprising a hinge part assocated with said seat part, a hinge part associated with said back rest and pivotally movable relative to said seat part hinge part about said pivot axis, and a locking device including an operating handle movable to cause said locking device to move into a released position, and biased into a position wherein the locking device is in a locked position, the improvement comprising an internally toothed ring defined in the back rest hinge part, at least one toothed detent having a toothed segment which, in the locked position engages said internally toothed ring, and a control member which, upon rotation in one sense by said handle disengages the toothed segment of the toothed detent from the internally toothed ring and, upon rotation in the opposite sense, engages said toothed segment of the toothed detent with said internally toothed ring.

8. A hinge assembly substantially as herein described with reference to the accompanying drawings.

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